



ENERGY STAR® Geothermal Heat Pump Program
Notice of Specification Revisions
May 22, 2000
Revision date June 27, 2000
Direct Expansion (DX) Revisions
in bold



The symbol for energy efficiency.

Below is a summary of upcoming changes to the ENERGY STAR Geothermal Heat Pump Specifications. For comparison purposes, the new specifications are presented first followed by the current specifications. EPA plans to issue the new specifications later this summer as explained in its memorandum dated May 22, 2000 and revised on June 27, 2000. Any questions or concerns should be directed to Andrew Fanara at <mailto:fanara.andrew@epa.gov> or Robin Clark at <mailto:rclark@icfconsulting.com>.

REVISED ENERGY STAR GEOTHERMAL HEAT PUMP SPECIFICATIONS (Version 2.0)

Definitions (Section II.J and II.K in Version 1.2 Agreement)

The COP and EER definitions below have been revised to reference ISO-13256-1 and ARI 870 as opposed to ARI 330-93, ARI 325-93, and CSA standard C748-94.

J. COP: Coefficient of Performance – A measure of efficiency in the heating mode that represents the ratio of total heating capacity to electrical energy input. For the purpose of this MOU, COP will be calculated for Closed Loop and Open Loop systems in accordance with the International Standards Organization (ISO) Test Standard 13256-1 as stated in Section IV below. **For Direct Expansion systems, COP will be calculated in accordance with the Air-Conditioning and Refrigeration Institute (ARI) 870 conditions.**

K. EER: Energy Efficiency Ratio - A measure of efficiency in the cooling mode that represents the ratio of total cooling capacity to electrical energy input. For the purpose of this MOU, EER will be calculated for Closed Loop and Open Loop systems in accordance with ISO 13256-1 as stated in Section IV below. For DX systems, EER will be calculated in accordance with **ARI 870 conditions**.

Technical Specifications (Section IV.B.1 in Version 1.2 Agreement)

The revised Closed Loop and Open Loop specifications are provided below. The Direct Expansion (DX) specifications also have been recently changed and are provided below.

Table 1: Phase 1 Technical Specifications*

| Product Type | EER | COP | Water Heating |
|---------------------|------------|------------|----------------------|
| Closed Loop | 14.1 | 3.3 | YES |
| With integrated WH | 14.1 | 3.3 | N/A |
| Open Loop | 16.2 | 3.6 | YES |
| With integrated WH | 16.2 | 3.6 | N/A |
| DX | 15 | 3.5 | YES |
| With integrated WH | 15 | 3.5 | N/A |

*Specifications in this table apply to single speed models. Multi-speed models may be qualified based on $EER = (\text{high speed EER} + \text{low speed EER})/2$; and $COP = (\text{high speed COP} + \text{low speed COP})/2$

Testing (Section IV.B.2.c in Version 1.2 Agreement)

The testing language has been revised to specify ISO 13256-1 and ARI 870 instead of their predecessors ARI 330-93, 325-93, and CSA 748-94.

1. **Closed Loop Systems**

Closed loop systems shall qualify under rating conditions in accordance with ISO 13256-1.

2. **Open Loop Systems**

Open loop systems shall qualify under rating conditions in accordance with ISO 13256-1.

3. **DX Systems**

DX systems shall qualify under rating conditions in accordance with ARI 870.

CURRENT ENERGY STAR GEOTHERMAL HEAT PUMP SPECIFICATIONS (Version 1.2)

Definitions

Below are the COP and EER definitions as currently provided in Sections II.J and II.K.

J. **COP**: Coefficient of Performance – A measure of efficiency in the heating mode that represents the ratio of total heating capacity to electrical energy input. For the purpose of this MOU, COP will be calculated in accordance with the Air-Conditioning and Refrigeration Institute (ARI) 330-93 for Ground Source Closed-Loop Heat Pump Equipment conditions or 325-93 for Ground Water-Source Heat Pump Equipment conditions as stated in Section IV below. For Direct Expansion systems, COP will be calculated in accordance with the Canadian Standards Association (CSA) standard C748-94 Performance of Direct Expansion (DX) Ground Source Heat Pumps conditions.

K. **EER**: Energy Efficiency Ratio - A measure of efficiency in the cooling mode that represents the ratio of total cooling capacity to electrical energy input. For the purpose of this MOU, EER will be calculated in accordance with ARI 330-93 or 325-93 rating conditions as stated in Section IV below. For DX systems, EER will be calculated in accordance with the CSA standard C748-94 Performance of Direct Expansion (DX) Ground Source Heat Pumps conditions.

Technical Specifications

Below are the energy-efficiency criteria as currently provided in Section IV.B.1.

Table 1: Phase 1 Technical Specifications*

| Product Type | EER | COP | Water Heating |
|---------------------|------------|------------|----------------------|
| Closed/Open Loop | 13 | 2.8 | YES |
| With integrated WH | 13 | 2.8 | N/A |
| DX | 13 | 3.1 | YES |
| With integrated WH | 13 | 3.1 | N/A |

*Specifications in this table apply to single speed models. Multi-speed models may be qualified based on $EER = (\text{high speed EER} + \text{low speed EER})/2$; and $COP = (\text{high speed COP} + \text{low speed COP})/2$

Testing

Below are the testing requirements as currently provided in Section IV.B.2.c.

1. **Closed Loop Systems**

Closed loop systems shall qualify under rating conditions in accordance with ARI 330-93.

2. **Open Loop Systems**

Open loop systems may qualify under rating conditions in accordance with ARI 325-93 using 70 degrees F incoming water temperature for cooling and 50 degrees F incoming water temperature for heating or may qualify under rating conditions in accordance with ARI 330-93.

3. **DX Systems**

DX systems shall qualify under rating conditions in accordance with CSA standards C748-94.